

DISTRIBUTION RECORDS OF CULICINE MOSQUITOES OF BASTAR DISTRICT, MADHYA PRADESH, INDIA (DIPTERA: CULICIDAE)¹

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(With a text-figure)

INTRODUCTION

Prakash and Husainy (1974) listed *Anopheles* mosquitoes taken in 102 villages of Bastar district, Madhya Pradesh between October 1968 and September 1974. Outdoor collections were made at various sites between the larval habitats and the village homes in order to determine the outdoor resting habits of the anophelines. In these surveys culicines were of course encountered along with the anophelines. The present paper lists the Culicini (Culicidae) collected.

In all 24 villages were selected for outdoor surveys which had the village of Asirguda located at 48.5 m a.s.l., as the lowest, and the locality Kirandul situated at 1275.5 m a.s.l. as the highest altitudes of the district. The majority of the villages are located in the North Eastern plateau and its sub-division, the Indravati plains. The general elevation of these physiographic divisions ranges from 457 to 609 m a.s.l. The climate is in the hot-wet to hot-moist range.

The villages which are sparsely populated, consist of several hamlets each with a few hutments situated at some distance from each

other. Each family of the village essentially keeps such domestic animals as cow, goat, pig, dog and poultry. Most of these are accommodated in cattle sheds.

The larval habitats in the area may be streams, ponds, ditches and seasonal pools. Large broken earthenwares are generally thrown in the backyard of the hutments in which sufficient rain water accumulates to provide larval breeding sites for aedine mosquitoes. In between the hutments and the larval habitats, grasses and shrubs are commonly found apart from the trees.

MATERIALS AND METHODS

Outdoor collections were made in natural vegetation, bushes, tree holes, crevices etc., located between the larval habitats and nearest human dwellings. An outdoor pit shelter (2 m × 1 m × 2 m) was constructed in one village (Bisnur) in this connection. The collections were generally attempted in the morning between 0600 and 0900 hr. A few man-biting rate observations were also taken to detect the species preferring human blood meals. This was done by placing a man as bait in human dwellings and collecting only the mosquitoes actually feeding on this bait since landing rates do not always indicate biting.

RESULTS OF OBSERVATIONS

A total of 1,014 specimens representing 14

¹ Accepted August 1978.

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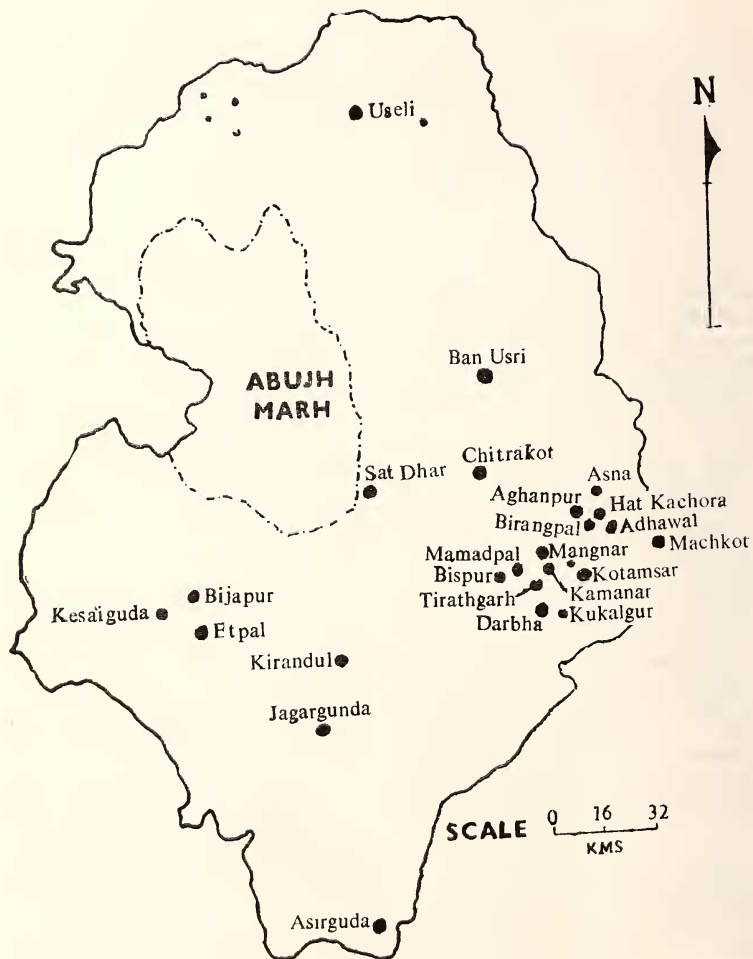


Fig. 1. Map of Bastar District showing the villages surveyed.

culicine species were collected in 24 localities of Bastar district. The locations of the villages surveyed are shown in the map (Fig. 1). More culicine mosquitoes (1,014 specimens) than anopheline (232 examples) were encountered in outdoor surveys. In the man-biting rate observations a total of 263 culicine and 67 anopheline females were captured in 80 man-hours. Thus more culicine than anopheline females had bitten human beings in the given time. Among culicines, the highest numbers were of *C. p. fatigans* (76 examples) and lowest were of *M. uniformis*.

The species wise habitat of all the recorded culicine mosquitoes is given below. The classification system enumerated by Stone *et al.* (1959) has been followed in this paper.

Genus: *Aedes* Meigen 1818

Aedes (*Stegomyia*) *albopictus* (Skuse), 1895

Specimens collected: Ban Usri 3 females (fm); Tirathgarh 1 fm; Mamadpal 9 fm; Jagargunda 3 males (m), 2 fm; Kirandul 7 fm; Sat Dhar 3 fm; Darbha 6 fm; Chitrakot 7 fm; Bijapur 15 fm; Kesaiguda 2 fm; Hat Kachora 1 m; Adhawal 1 fm; Useli 3 m. 4 fm; Kotamsar 29 fm; Kamanar 2 m, 8 fm; Kulkalpur 5 m, 2 fm; Aghanpur 1 m, 9 fm; Asna 2 fm. Total 15 m and 110 fm.

Distribution: This species was recorded in the North-Eastern plateau, Godavari-Sabri lowlands, Bailadila hills, Indravati plains and Southern plateau of the Bastar district.

Altitudes: Encountered between 48.5 and 1275.5 m a.s.l.

Seasonal prevalence: Collected in January, May, July and November in the hot-moist, hot-wet, moderately hot-moist and very hot-moist climatic regions of the district.

Observations: *A. (S.) albopictus* is a dominant species in the district. A massive attack on human being for feeding in the day was noticed in the forests of the village Kotamsar. In the township of Jagdalpur, this mosquito is predominantly a day-time feeder. Baisas

(1974) stated that *A. albopictus* attacks man but in places far away from human dwellings, it probably feeds on animals. Specimens of *A. albopictus* were captured on human body while collecting and from bushes, tree holes and fences. Twenty females were taken inside houses. Joshi *et al.* (1965) collected five females outdoors in jungles of Nepal. The breeding in Bastar district was noticed in broken earthen pots retaining rain water. Baisas (1974) stated that *A. albopictus* breeds mostly in tree holes in Subic, seldom in bamboo, rock holes and artificial containers. Huang (1972) stated that the immature stages of *A. albopictus* have been found mainly in tree holes, bamboo stumps and artificial containers in Philippines, Ryukyu Island, Taiwan, Vietnam, Thailand, Malaysia, Burma and India. Peters and Dewar (1956) reared *A. albopictus* and *A. w-albus* from eggs contained in the dried residue in holes in mango trees. These eggs had survived at least seven months since the last rainy season and hatched within a day or two of addition of water.

Aedes (*Mucidus*) *sactophagoides* (Theobald), 1901

Specimens collected: Mangnar 7 m, 2 fm; Darbha 4 m, 6 fm; Adhawal 3 m, 2 fm; Ban Usri 3 fm; Jagargunda 2 fm; Sat Dhar 1 fm. Total 14 m, 16 fm.

Distribution: Recorded in the Indravati plains, North-Eastern plateau, Godavari-Sabri lowlands and Tinkanpalli hills.

Altitudes: 152 to 761 m a.s.l.

Seasonal prevalence: Collected in March, May, July, September and October in the hot-wet, hot-moist and very hot-moist climatic regions.

Observations: This mosquito was taken in bushes near a stream (Darbha); from fence crevices (Adhawal), underneath the logs (Kulkalpur) and from a pit shelter (Bisnur). Joshi *et al.* (1965) took three females each from a mosquito net and inside a house in Nepal.

Aedes (Stegomyia) w-albus (Theobald), 1905
Specimens collected: Mangnar 11 m, 3 fm; Darbha 4 m, 3 fm; Adhawal 2 m; Hat Kachora 2 fm; Ban Usri 3 fm, Useli 5 fm; Total 17 m, 16 fm.

Distribution: Recorded in the Indravati plains, North-Eastern plateau of Bastar district.

Altitudes: Between 457 and 761 m a.s.l.

Seasonal prevalence: Collected in March, May, July and September in the moderately hot-moist, hot-moist and the hot-wet climatic regions.

Observations: Specimens of *A. w-albus* were secured in a pit-shelter (Bispur); ponds (Ban Usri), tree holes (Useli) and from tall grass (Mangnar). Joshi *et al.* (1965) collected two females from a jungle in Nepal.

Aedes (Stegomyia) aegypti (Linnaeus), 1762

This species was not encountered anywhere in the district although diurnal surveys were made in the townships of Jagdalpur, Kirandul and Kanker. It requires further study to ascertain if this mosquito is prevalent in Bastar district, for this is typically a dense forest area. However, at present, forests are being cleared and the towns are growing in magnitude. Baisas (1974) reported the distribution of this mosquito in South-East Asia, Indo-Malayan region and elsewhere where modern transportation distributed this mosquito.

Aedes (Stegomyia) vittatus (Bigot), 1861

Specimens collected: Machkot 5 fm; Ban Usri 2 fm; Kotamsar 17 fm; Tirathgarh 1 fm; Darbha 3 fm; Mamadpal 2 fm; Mangnar 1 m; Chitrakot 6 fm; Kesaiguda 3 m, 3 fm; Useli 2 fm; Kukalgur 7 fm; Bispur 3 m, 2 fm; Aghanpur 2 m, 2 fm; Asna 2 m, 3 fm. Total 11 m, 55 fm.

Distribution: Recorded in Indravati plains, North-Eastern plateau and Southern plateau.

Altitudes: Encountered between 48.5 and 761 m a.s.l.

Seasonal prevalence: Recorded in May, from July to November in the hot-wet and the hot-

moist climatic regions.

Observations: Predominant in forests of Bastar district. Specimens of *A. vittatus* were caught on human beings and from bushes in the forests. Five females were secured in tree holes (Machkot) in forests. Joshi *et al.* (1965) collected two examples of this mosquito from jungle in Nepal.

Genus: *Culex* Linnaeus 1758

Culex (Culex) bitaeniorhynchus Giles, 1901

Specimens collected: Kotamsar 2 fm; Mamadpal 1 fm; Kukalgur 6 fm; Kesaiguda 1 m, 1 fm; Bispur 3 m, 1 fm; Darbha 3 m, 4 fm; Kamanar 1 m, 4 fm; Total 8 m, 19 fm.

Distribution: Recorded in the Indravati plains; North-Eastern plateau, Southern plateau. Bram (1967) reported distribution in Thailand, Ethiopia including Madagascar, Australia, New Guinea, some islands of the South Pacific and the Soviet Far East.

Altitudes: 152 to 671 m a.s.l. Peters and Dewar (1956) collected larvae of *C. bitaeniorhynchus* from residual pools in the main river beds at Bhimphe, Nepal at 11,583 m height.

Seasonal prevalence: Encountered in March, May, July, September and November in the hot-wet and hot-moist area.

Biting habits: Twenty one females were captured on human bait. In Singapore the origin of blood meals in females collected from unbiased sources were exclusively from birds (Colless 1959 as quoted by Bram 1967).

Observations: Recorded in forests of Bastar district. This mosquito was taken in bamboo fences in the courtyards (Darbha); from a pit shelter (Bispur), green grass in the vicinity of hutments (Tirathgarh). Joshi *et al.* (1965) collected this mosquito inside houses in Nepal.

Culex (Culex) epidemus (Theobald), 1910.

Specimens collected: Ban Usri 1 m; Kukalgur 3 fm; Jagargunda 5 m, 2 fm; Sat Dhar 1 m, 2 fm; Darbha 5 m, 5 fm; Kamanar 3 m, 10 fm; Aghan-

pur 32 m, 35 fm; Adhawal 18 m, 27 fm; Asna 16 m, 13 fm; Hat Kachora 28 m, 22 fm; Useli 6 m, 11 fm; Kotamsar 3 fm; Kesaiguda 6 m, 2 fm; Bispur 4 m, 5 fm, Birangpal 2 m, 2 fm: Total 127 m, 142 fm.

Distribution: Recorded in the North-Eastern plateau; Godavari Sabri lowlands; Tinkanpalli hills, Indravati plains and Dantewara plains.

Altitudes: 48.5 to 761 m a.s.l.

Seasonal prevalence: Collected all round the year in the hot-moist, hot-wet, moderately hot-moist and very hot-moist climatic regions. Abundant during August in village Hat Kachora.

Biting habits: A total of 76 females were secured from human bait.

Observations: Predominant species all over the district. Collected from bushes near the fencing of a farm; from pit shelter, and from vegetation in the vicinity of houses. Joshi *et al.* (1965) took females from inside houses and one female from pit shelter in Nepal.

Culex (Culex) pipiens fatigans Wiedemann, 1828

Specimens collected: Machkot 35 fm; Ban Usri 2 fm; Kukalgur 1 m, 1 fm; Mamadpal 4 fm; Mangnar 9 m, 5 fm; Kamanar 1 m, 12 fm; Kirandul 3 m, 5 fm; Chitra Kot 5 m, 3 fm; Etpal 1 m; Bijapur 1 fm; Bispur 6 m, 6 fm; Birangpal 1 fm; Asirguda 8 fm; Useli 9 m, 4 fm; Hat Kachora 5 m, 7 fm; Adhawal 3 m, 3 fm; Aghanpur 6 m, 7 fm; Asna 2 m, 5 fm: Total 51 m, 109 fm.

Distribution: Recorded in the Indravati plains; North-Eastern plateau; Bailadila hills, Godavari-Sabri lowlands. This mosquito is distributed throughout the world in tropical and sub-tropical areas (Baisas 1974).

Altitudes: 48.5 to 1275.5 m a.s.l.

Seasonal prevalence: Collected all round the year in the hot-moist, hot-wet, moderately hot-moist and very hot-moist climatic regions.

Biting habits: From human bait 97 females

were taken. Seven blood meals obtained from adult females taken out of doors had two smears positive for human and five for bovine blood. Baisas (1974) indicates that from its large number it constitutes the most annoying *Culex* to human beings. Very seldom taken in Carabao-baited traps but numerous in human baited traps and in unscreened houses, barns and huts (Baisas 1974).

Observations: Predominant species all over the district. Encountered in pit shelter and out of doors in a variety of places namely bushes, vegetation, bamboo fences, fence crevices and underneath logs. It must be recognised that the result of investigations in one geographical area are not necessarily valid when applied to another population of the same subspecies in a different geographical area (Bram 1967).

Culex (Culex) gelidus Theobald, 1901

Specimens collected: Kotamsar 3 fm; Tirathgarh 4 fm; Mamadpal 2 m, 3 fm; Darbha 2 m, 6 fm; Bispur 1 fm; Kukalgur 1 m, 2 fm; Sat Dhar 1 m, 2 fm; Aghanpur 3 m, 8 fm; Useli 4 m, 1 fm: Total 13 m, 30 fm.

Distribution: Recorded in the North-Eastern plateau; Tinkanpalli hills, Indravati plains. Baisas (1974) reported distribution from Malaysia, Singapore, Indonesia, New Guinea, Philippines, Taiwan, Japan, China, Vietnam (N & S) Cambodia, Laos, Thailand, Burma, Nepal, India, Pakistan and Sri Lanka.

Altitudes: Recorded between 304 and 761 m a.s.l. Scanlon and Esah as quoted by Bram (1967) collected *gelidus* females biting man from 4,572 to 13,716 m of elevation on a mountain in Chiang Mai.

Seasonal prevalence: Collected in July, October to December in hot-moist, moderately hot-moist and hot-wet climatic regions.

Biting habits: Eleven females were secured from human bait. Baisas (1974) stated this mosquito as zoophilic. Bram (1967) reported

that adult females are vicious biters but feed on man only in the absence of other suitable hosts.

Observations: Collected from bushes near stream, in tree holes and in pit shelter. Recorded in forest at higher altitudes. Joshi *et al.* (1965) secured three females from houses and three examples from pit shelter. Peters and Dewar (1956) found adults in native dwellings, cattlesheds and in tents in Nepal.

Culex (Culex) tritaeniorhynchus Giles, 1901

Specimens collected: Darbha 2 m, 5 fm; Kotamsar 3 m, 1 fm; Mamadpal 1 m, 2 fm; Mangnar 3 fm; Kukalgur 8 m 6 fm; Bispur 1 fm; Kamanar 4 m, 11 fm; Total 18 m, 29 fm.

Distribution: Recorded in the North-Eastern plateau and Indravati plains of Bastar district. Bram (1967) reported distribution throughout Thailand, India, Sri Lanka, Maldiv Islands, Malagasy, Tanzania, Kenya, Ubangishari, Nigeria, Benin, Togo, Senegal, Egypt, Israel, Lebanon, Syria, Turkey, Iraq, Iran, Turkmen S.S.R., Philippines, Taiwan, Ryukyu-Retto, Japan, Korea, China, Indochina, Indonesia, Malaya and Maritime province, U.S.S.R.

Altitudes: 304 to 761 m a.s.l. Scanlon and Esah as quoted by Bram (1967) collected females biting man at elevation up to 1,372 m in Chiang Mai.

Seasonal prevalence: Collected in July, September and November in the hot-moist and hot-wet climatic regions.

Biting habits: On human bait, 17 females were captured. Baisas (1974) reported that this mosquito is largely zoophilic, a certain percentage bite human beings and so this mosquito becomes the object of interest and study in connection with Japanese 'B' encephalitis and other diseases of man.

Observations: Recorded in forests at higher

altitudes and in pit shelter. Nakao as quoted by Bram (1967) suggested that *C. tritaeniorhynchus* may be an indoor resting species. Specimens of *C. tritaeniorhynchus* were secured in tree holes, underneath logs, and from bushes in the courtyard of the hutments. Joshi *et al.* (1965) captured one female from pit shelter, six females from outdoors and three females inside house in Nepal.

Culex (Lutzia) vorax (Edwards), 1921

Specimens collected: Kotamsar 1 fm; Kamanar 7 fm; Mangnar 6 m; Darbha 1 m, 2 fm; Kukalgur 1 m, 1 fm; Adhawal 3 m, 1 fm; Useli 8 fm, Mamadapil 3 m, 5 fm; Total 14 m, 25 fm.

Distribution: Recorded in the Indravati Plains and North-Eastern Plateau.

Altitudes: 457 to 761 m a.s.l.

Seasonal prevalence: Collected in June, July, September to November in the moderately hot-moist and hot-wet climatic regions.

Observations: This mosquito was taken in bushes in forests (Kotamsar); tree holes (Useli), underneath logs and from tall grass.

Culex (Culex) 'vishnui' Theobald, 1901 Group

Specimens collected: Mamadpal 1 fm; Darbha 11 m, 35 fm; Etpal 14 m, 3 fm; Adhawal 3 m, 2 fm; Total 28 m, 41 fm.

Distribution: Recorded in the North-Eastern plateau, Indravati plains and Godavari Sabri lowlands.

Altitudes: 48.5 to 761 m a.s.l.

Seasonal prevalence: Collected in Feb., Sept. to Dec. in the hot-wet, hot-moist and very hot-moist climatic region.

Biting habits: A total of 32 females were taken on human bait.

Observations: Specimens of this species were encountered in grass in the vicinity of hutments; fences along side rice fields, bushes in courtyards and from pit shelter.

CULICINE MOSQUITOES OF BASTAR

Genus: *Mansonia* Blanchard 1901

***Mansonia (Mansonioides) annulifera* (Theobald), 1901**

Specimens collected: Kotamsar 3 fm; Kamanar 3 fm; Darbha 3 m, 2 fm; Kesaiguda 1 m, 2 fm; Kulkalgur 4 m, 2 fm; Useli 2 m, 3 fm; Aghanpur 2 m, 3 fm; Bispur 3 fm; Hat Kachora 3 m, 6 fm: Total 15 m, 27 fm.

Distribution: Recorded in the Indravati plains, North-Eastern plateau and Dantewara plains. Baisas (1974) quoted distribution in Philippines (Mt. Province, Sorsogen, Leyte, Olongapo Zambales, Manila and Rizal), Ethiopia, Oriental and Australian regions, Solomon Islands, Japan and Ryukyu-Retto.

Altitudes: Between 48.5 and 761 m a.s.l.

Seasonal prevalence: Collected in Jan., Feb., May, July to Sept. and Nov. in the hot-wet, hot-moist and moderately hot-moist climatic regions.

Biting habits: Not secured on human bait. Baisas (1974) reported it as both zoophilic and anthrophilic. Specimens were collected in Carabao-baited traps, a few were caught while biting man in late afternoon (Baisas 1974).

Observations: *M. annulifera* was encountered in bushes near perennial stream, in pit shelter and fences along side rice fields. Joshi *et al.* (1965) encountered this mosquito inside house in Nepal.

***Mansonia (Mansonioides) uniformis* (Theobald), 1901**

Specimens collected: Ban Usri 1 m, 1 fm; Darbha 4 fm; Tirathgarh 1 m, 3 fm; Kotamsar 2 fm; Kulkalgur 3 fm; Kesaiguda 2 m, 2 fm; Bispur 7 fm, Adhawal 3 m, 3 fm: Total 7 m, 25 fm.

Distribution: Recorded in the North-Eastern plateau, Indravati plains and Dantewara plains. Baisas (1974) reported distribution from Philippines, South-East Asia, Indonesia and Thailand.

Altitudes: 152 to 761 m a.s.l.

Seasonal prevalence: Collected in May, July to December in the hot-moist and hot-wet climatic regions.

Biting habits: Nine females were secured on human bait. Baisas (1974) described it as largely zoophilic, seldom anthrophilic.

Observations: Specimens were secured in a tree hole at a height of 1.2 m above the ground. Encountered in pit shelter, bushes near ponds and from vegetation out of doors. Joshi *et al.* (1965) collected *M. uniformis* inside house in Nepal.

Genus: *Armigeres* Theobald 1901

***Armigeres (Armigeres) subalbatus* (Coquillett), 1898**

Specimens collected: Mangnar 9 m, 1 fm; Kulkalgur 4 fm; Darbha 3 m, 7 fm; Adhawal 2 m; Kesaiguda 4 fm, Ban Usri 2 fm: Total 14 m, 18 fm.

Distribution: Recorded in the Indravati plains, the Southern plateau and the North-Eastern plateau of Bastar district. Baisas (1974) reported distribution from Philippines, Indonesia, Malaysia, and Japan.

Altitudes: 152 to 761 m a.s.l.

Biting habits: Not taken on human bait. Baisas (1974) indicated that this mosquito is seldom anthrophilic.

Seasonal prevalence: Collected in March, July, Sept. and Oct. in hot-wet and hot-moist climatic regions.

Observations: Specimens were taken in the bushes near a stream, tree holes and fences of rice fields having tall grass. Joshi *et al.* (1965) took six females from jungle and two females from inside houses in Nepal. Baisas (1974) reported that *A. subalbatus* usually breeds in cut bamboos, sometimes in coconut shells and artificial containers.

ACKNOWLEDGEMENTS

I am grateful to Dr. B. L. Wattal, Dy. Di-

rector, Medical Entomology Division, National Institute of Communicable Diseases, Delhi for identification of specimens and to Dr. Ronald

A. Ward, Mosquito Entomology Project, Smithsonian Institution, Washington D.C. for critical comments on the paper.

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